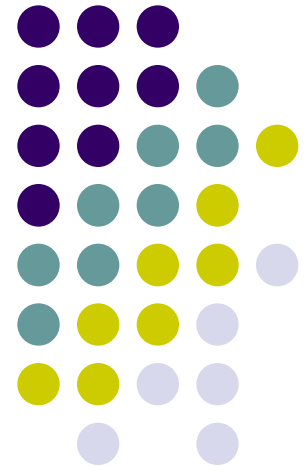


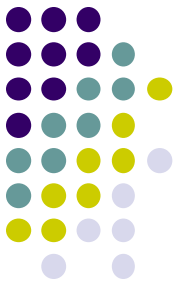
Money Market & Bond Market





Course Objectives

- Learn about basic structures and conventions of Fixed Income Instruments
- Learn about Domestic Money Market & How it Operates
- Learn about Government Securities, T-Bill & T-Bonds
- Valuation of Fixed Income Instruments
- Understand pricing mechanisms and trading of bond instruments.
- Trading Strategies for bond market
- Identify risks in fixed income investments



FIXED INCOME SECURITIES

- Debt Securities: normally pay fixed amount of interest during their life or at maturity. (Exceptions – zero-coupon instruments)
- Repay a fixed amount of principal at the date of maturity. Specific maturity date, fixed face or redemption value
- Future cash flows are defined and can be calculated in advance
- Issued primarily by Governments & their agencies and highly rated corporate borrowers

Main Features



- Maturity (Tenor)
- Face Value (Par Value)
- Coupon type (fixed / floating / zero coupon) & frequency
- Any Embedded Options (Callable or Puttable)
- Credit Rating^{*}_—
- Day count basis



Interest Payments

- Fixed Coupon Bond
fixed coupon debt security - coupons are fixed normally. Variations possible. e.g step-up coupon Bond
- Floating Rate Note
coupons periodically reset at agreed intervals at specific reference rates & spreads
- Zero Coupon Bond
no intervening interest payments - issued well below par with redemption value at face value or par

Embedded Options



- Call Option

The issuer retains right to retire the debt, fully or partially before scheduled maturity .

- Put Option

The Investor has the right to sell the issue back to the issuer at par value on designated dates.

- Convertible bond

Issue can be exchanged for specified amounts of common stocks.

- Caps

Maximum interest rate issuer has to pay in a floating rate bond with a cap.

- Floor

Minimum interest rate investor is getting in a floating rate bond with a floor.



Rating Structure

<u>Moody's</u>	<u>S&P</u>	<u>Fitch</u>	
Aaa	AAA	AAA	Highest Credit Quality
Aa	AA	AA	Highest Credit Quality - moderate risk
A	A	A	Variable Risk - average protection
Baa	BBB	BBB	Protection factors below average
Ba	BB	BB	Below Invest. Grade - likely to meet
B	B	B	Below Invest.grade- may not meet obligations
Caa-C	CCC-C	CCC-C	Speculative - well below invest.grade
	D	DDD-D	Defaulted Bond



Day Count Conventions

- ACT/360 - actual no. of days and assume there are 360 days in year
- ACT/365 - actual no. of days and assume there are 365 days in year
- ACT/ACT - actual no. days for both the coupon and the year
- 30/360 - no. of days in each month assumed to be 30

Variations 30 (E)/360 and 30(A)/360 for Corporate Bonds

Consider two dates: $d1/m1/y1$ to $d2/m2/y2$

30(E) - if either $d1$ or $d2$ is 31, change it to 30

30 (A) - if $d1$ is 31 and $d2$ is not 30 or 31, then do not change $d1$ to 30



Day Count Conventions for some key instruments

- USA
 - Depo/CD ACT/360
 - \$CP/T-Bill ACT/360
 - T-Bond/T-Note ACT/ACT
 - Corporate Bonds 30(A)/360
- UK
 - Depo/CD/T-Bill ACT/365
 - Gilts ACT/ACT
- Japan
 - ` - Money Market and JGB ACT/365
- EUROPE
 - Money Markets ACT/360 and Bonds ACT/ACT
- **Sri Lanka – Money Market ACT/365 ,Bonds ACT/ACT , T-bill ACT/364**



FIXED INCOME SECURITIES

- Money Market Instruments
 - Short-term instruments issued with maturities of one year or less are considered as Money Market instruments
- Bond Market Instruments
 - Medium to long-term debt securities with maturities typically more than one year are considered as bond market instruments.

Types of Fixed Income Securities

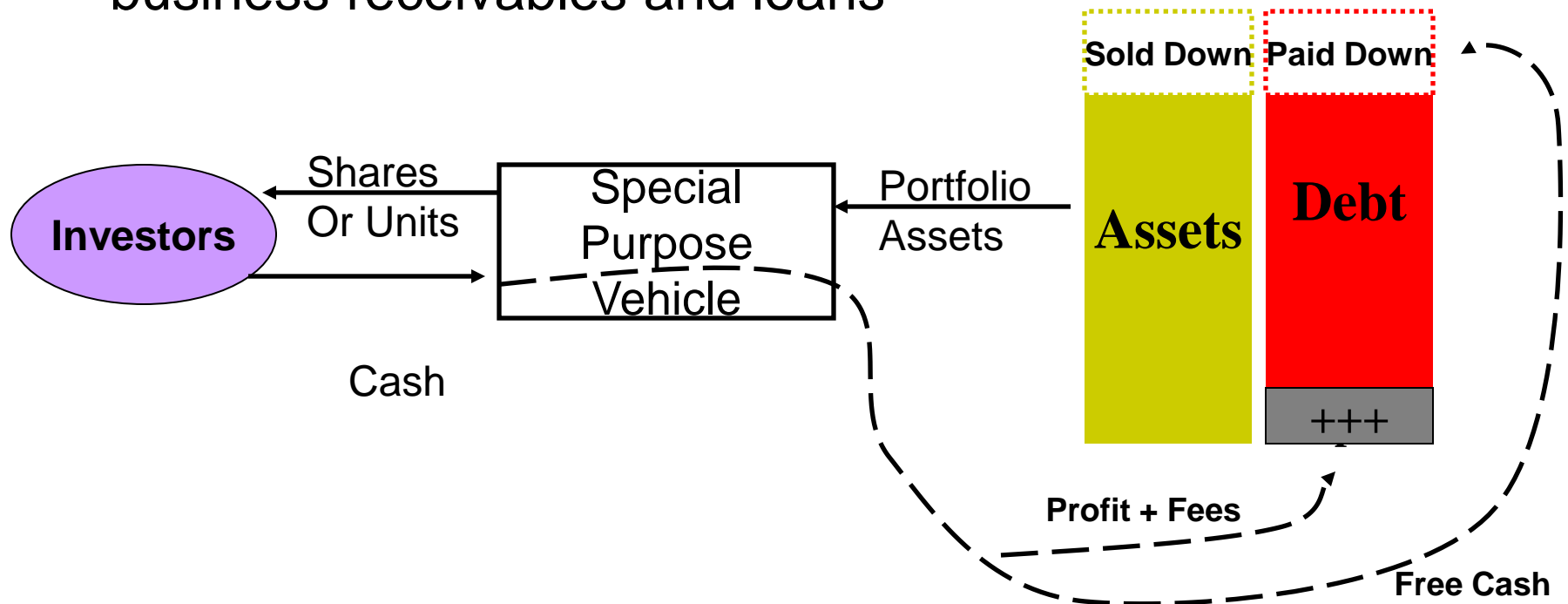


- Money Market Instruments
 - Treasury Bills, Certificates of Deposit, Commercial Paper, Repurchase Agreements (REPO)
- Bonds
 - Treasury Bonds & Corporate Bonds
- Mortgage-Backed Securities
 - securities backed by pools of mortgages
- Asset Backed Securities
 - securities backed by a portfolio of assets like credit card receivables etc.



Asset-backed security (ABS)

- A tradable security that is collateralized by streams of cash flows
- Assets typically used are mortgages, consumer and business receivables and loans





Money Market

- Wholesale financial markets in which Governments, Banks and Corporations raise funds or invest funds through loans/deposits, debt securities and other instruments for short term financing needs
- Primarily used for short term financing needs
- Interest Rate Instruments with maturities up to 12 months



Money Market

- Short-term instruments issued with maturities of one year or less
- The market for these instruments is called Money Market
- Money Market Instruments
 - Interbank Deposits
 - Treasury Bills,
 - Commercial Paper,
 - Repurchase Agreements (REPO)
 - Certificates of Deposit,



Money Market Participants

- Governments
- Central Banks
- Commercial Banks
- Corporations
- Supra-nationals
- Insurance Companies
- Mutual Funds/Unit Trusts
- Brokers
- Large Investors

Banks



- Borrow and lend in interbank money markets
- Borrow from and lend to corporate and retail clients
- Invest surplus funds in money market instruments
- Maintain liquidity and reserve requirements of local regulators
- Arrange issuance of Debt for large corporates and underwrite
- Trade in Money Market instruments

Corporates



- Invest in wholesale deposits, retail deposits
- Investments in short-term instruments like Bills and CDs
- Borrow from Banks as Loans
- Issue Commercial Paper (CP) for short-term borrowings

Central Bank



- Supervise banking activities in money markets and regulate
- Issue on behalf of Government, Treasury Bills and Treasury Bonds
- Ensure adequate liquidity in markets
- Manage monetary policy through open market operations



Interbank Deposits

- The wholesale borrowing & lending of funds between banks and FIs
- The loans are usually unsecured
- Either in domestic currency or euro market (in non domestic currency)
- **Call money** – money left on deposit for an unspecified period (Very short period) , which may be withdrawn either immediately or after an aggregated notice period
- **Term Money /deposits** – Maturities up to one year
- **Overnight Money** - Where banks borrow from today to tomorrow
- **Prices are quoted as percentage** - Bid /Offer

Eg	9.50	9.625
	BID	Offer



Treasury Bills

- Issued by the Government
- Consider as risk free securities
- Issued through an auction process
- In Sri Lanka T-Bills are issued - 91 days.182 days 364 days
- Primary Markets & Secondary Market



DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
ISSUE OF TREASURY BILLS

**Rs. 185,000 million Treasury bills are to be issued through an auction
on 06th December 2023**

The details of Treasury bill issues are as follows.

Maturity Period	91 Days	182 Days	364 Days	Total
ISIN*	LKA09124C086	LKA18224F078	LKA36424L062	
Amount Offered (Rs. Mn.)	55,000	60,000	70,000	185,000

Date of Auction	:	06 th December 2023
Date of Settlement	:	08 th December 2023
Date of Issue	:	08 th December 2023
Closing date and time of bid submission	:	Wednesday 06 th December 2023, at 11.00 a.m.
Minimum amount of a bid	:	Rupees five million (Rs. 5,000,000/-) and multiples of Rupees one million (Rs. 1,000,000/-) there onwards.

Bids are invited from the Primary Dealers in Government Securities. Bids should be made only through the electronic bidding facility provided by the Central Bank of Sri Lanka (CBSL). The prospective investors (general public or any other investor) may submit bids to the auction through following Primary Dealers while complying with the minimum amount of a bid as mentioned above.

List of Primary Dealers

Acuity Securities Ltd.	2206297	NSB Fund Management Co. Ltd	2425010
Bank of Ceylon	2541938	People's Bank	2206783
Capital Alliance PLC	2317777	Sampath Bank PLC	2305842
Commercial Bank of Ceylon PLC	2332319	Seylan Bank PLC	2456340
First Capital Treasuries PLC	2639883	WealthTrust Securities Ltd	2675096

The CBSL may accept a higher or lower amount than the offered amounts for each maturity by reallocating amounts between the maturities, depending on the market conditions, but without exceeding the total amount on offer at this auction.

Prospective investors may also purchase Treasury bills from Primary Dealers or any other Licensed Commercial Bank in the secondary market.

* International Securities Identification Number

Issuing Office

Public Debt Department
Central Bank of Sri Lanka
30, Janadhipathi Mawatha, Colombo 1.
Telephone: +94 11 2477011 Fax: +94 11 2477687

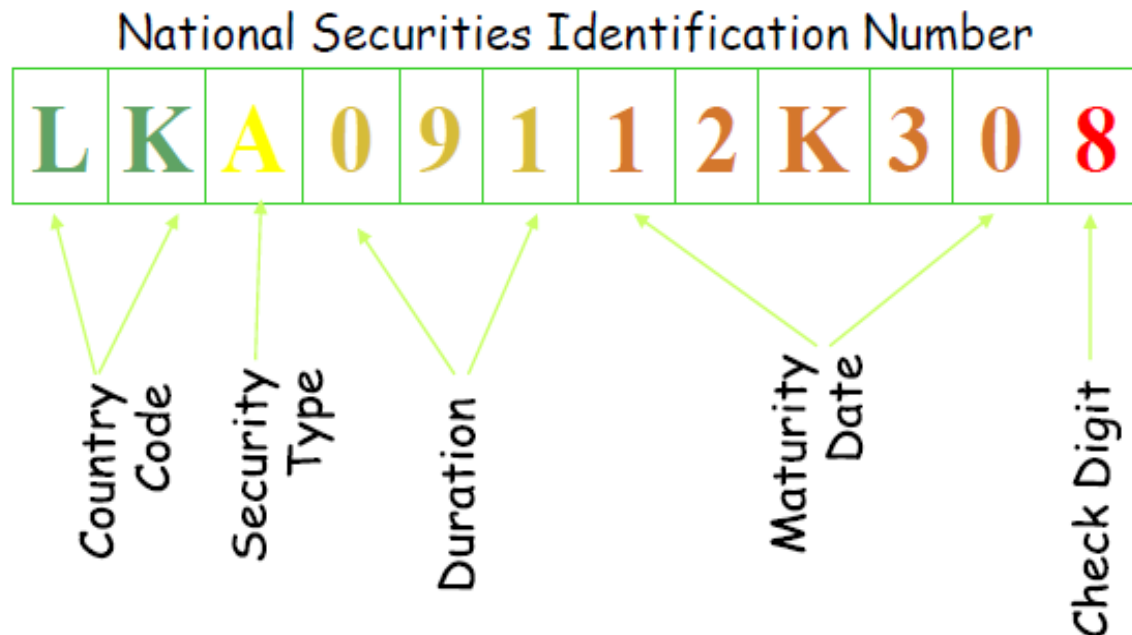
N. D. Y. C. Weerasinghe
Superintendent / Registrar of Public Debt



International Securities Identification Number (ISIN)



- Each series of securities is uniquely identified by the International Securities Identification Number (ISIN).
- ISIN of a 3 month bill maturing on November 30th 2012





Auction Process

- Competitive Bidding
 - Multiple price auction
 - Single price auction

Auction Process



Issuer is offering LKR 500 Mn

BIDDER	AMOUNTS (MN)	BID YIELD	ALLOCATION(MN	CUM
A	150	8.1%	150	150
B	110	8.2%	110	260
C	90	8.2%	90	350
D	100	8.3%	100	450
E	75	8.4%	37.5	487.5
F	25	8.4%	12.5	500
G	80	8.6%	Rejected	
H	70	8.8%	Rejected	
I	85	9.0%	Rejected	



Auction Process

Compute the Weighted Average Yield

- Compute the Total Allocation
 - $150+110+90+100+37.5+12.5=500$
- Compute the Weighted Sum of Yields
 - $(150 \times 8.10) + (110 \times 8.20) + (90 \times 8.20) + (100 \times 8.30) + (37.5 \times 8.40) + (12.5 \times 8.40) = 4105$
- Compute the Weighted Average Yield
 - $$\text{Weighted Average Yield} = \frac{\text{Total Weighted Yield}}{\text{Total Allocation}}$$
$$= 4105/500 = 8.21\%$$



Present Value Calculation

$$FV = PV(1 + r)^n$$

- FV = Future Value
- PV = Present Value
- r = Compounding rate
- n = Number of compounding periods

$$PV = FV / (1 + r)^n$$



T-Bill Price Calculation

$$\text{Price} = \frac{100}{1 + \left(\frac{r \times n}{364} \right)}$$

r = interest rate

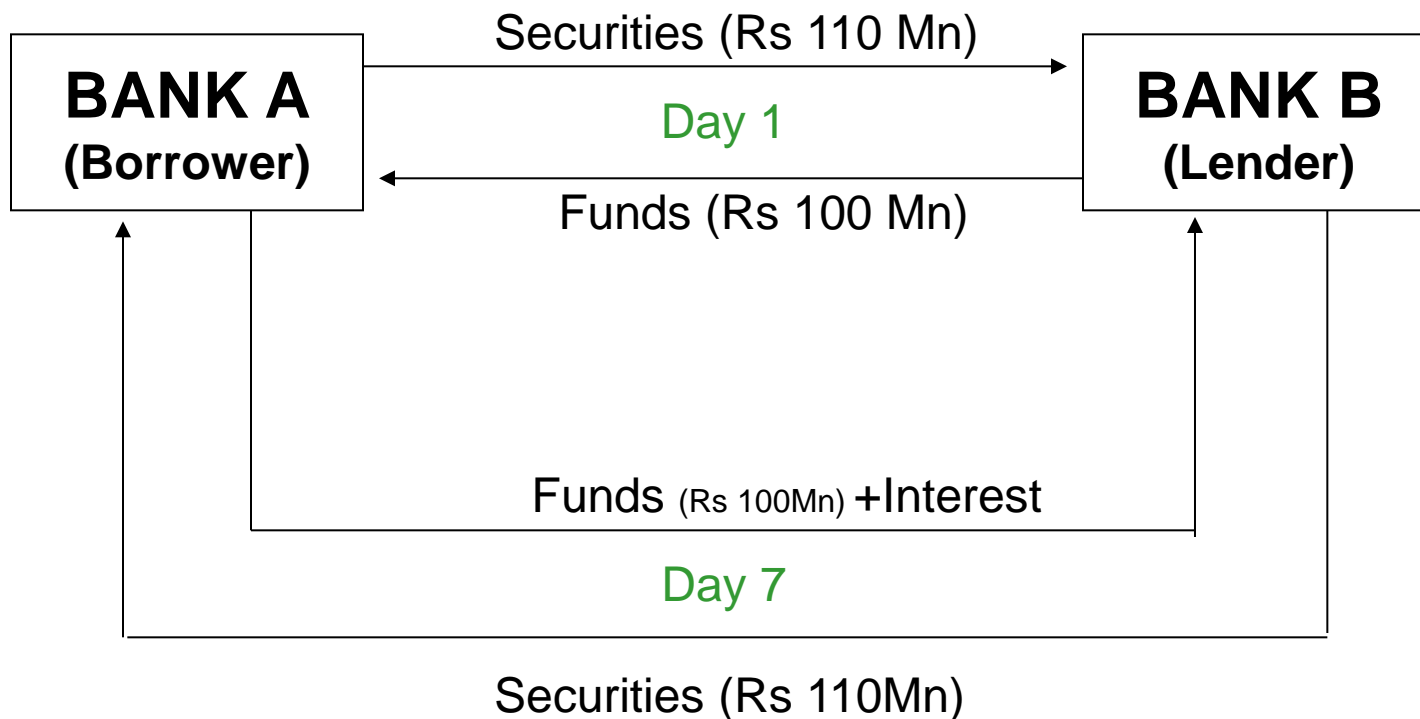
n = no of days to maturity

Price is given for 4 decimal places for LKR
100 FV



Repurchase Agreement

Bank A (borrower) agrees with Bank B (lender) to borrow monies for a short term against the delivery of marketable securities as collateral. At the end of the agreed period of 7 days, bank B would release the securities against paying back by bank A.





Commercial Papers

- Issued by the corporations
- To raise funds on a short term basis
- Maturities are less than one year
- The dealers set interest rates for various maturity dates



Certificate of Deposits

- CDs may be issued in a "tranche" or on "tap".
- In the "tranche" method, the issuing bank seeks a predetermined amount of deposits for a specific period and at a certain interest rate, often appointing a manager (bank) to solicit the deposits.
- "Tap" CDs are issued on demand on terms dependent on market conditions and investor requirements at the time of issue.



Bond Price Calculation

- Price of Bond is sum of present values of all future cash flows
- To determine the price we need to
 - Estimate of expected cash flows
 - Estimate of the appropriate required yield

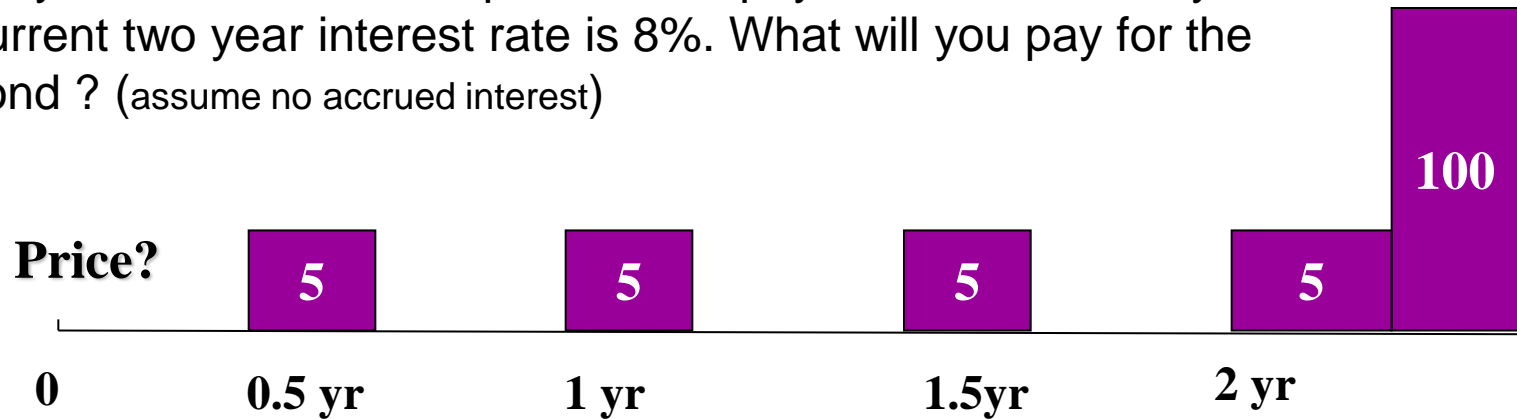
$$\text{Price} = \frac{C1}{(1+r)} + \frac{C2}{(1+r)^2} + \frac{C3}{(1+r)^3} + \dots + \frac{Cn}{(1+r)^n}$$

- Price = Sum of PVs of Cash Flows



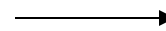
Bond Price Calculation

- A 2 year Bond with a coupon of 10% payable semi-annually. Current two year interest rate is 8%. What will you pay for the Bond ? (assume no accrued interest)

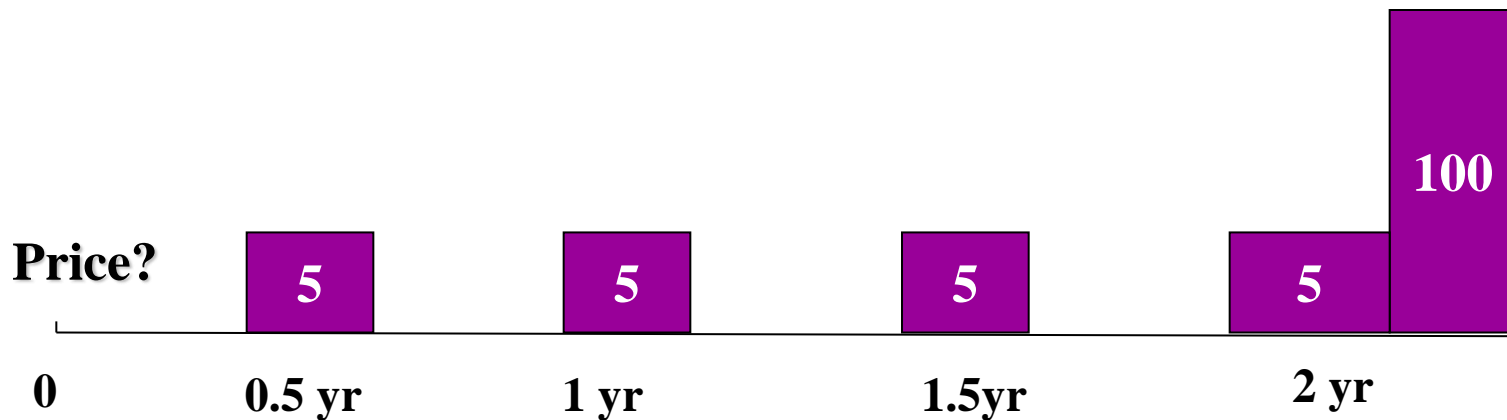


$$\text{Price} = \frac{5}{1.04} + \frac{5}{(1.04)^2} + \frac{5}{(1.04)^3} + \frac{105}{(1.04)^4}$$

$$103.6299 = 4.8077 + 4.6228 + 4.4450 + 89.7544$$



Bond Price Calculation



- Current two year interest rate is 12%. What will you pay ?

$$\text{Price} = \frac{5}{1.06} + \frac{5}{(1.06)^2} + \frac{5}{(1.06)^3} + \frac{105}{(1.06)^4}$$

$$96.5349 = 4.7170 + 4.4500 + 4.1981 + 83.1698$$

- Current two year interest rate is 10%. What will you pay ?

$$\text{Price} = \frac{5}{1.05} + \frac{5}{(1.05)^2} + \frac{5}{(1.05)^3} + \frac{105}{(1.05)^4}$$

$$100.00 = 4.7619 + 4.5351 + 4.3192 + 86.3838$$

The relationship between coupon rate & YTM



years	Coupon (ba)	YTM	Clean Price	
2	10	8.00	103.45	Premium Bond
2	10	10	100	Par Bond
2	10	12	96.15	Discount Bond

- Premium Bond
 - Market Interest Rate < Coupon Rate value
 - Clean Price > Par
- Par Bond
 - Market Interest Rate = Coupon Rate
 - Clean Price = Par value
- Discount Bond
 - Market Interest Rate > Coupon Rate value
 - Clean Price < Par



Bond Pricing

- Clean Price = PV of all future cash flows of the bond
- If the Bond is priced on any date other than coupon date, adjustments to accrued interest should be made.

$$\text{Clean Price} + \text{Accrued Interest} = \text{Dirty Price}$$

- Accrued interest
= $\frac{\text{days from last coupon payment}}{\text{no. of days in coupon period}} \times \text{coupon amount}$
- Bond Price with accrued interest = Dirty Price

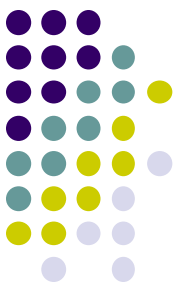


Bond Pricing

- Clean Price = PV of all future cash flows of the bond
- If the Bond is priced on any date other than coupon date, adjustments to accrued interest should be made.

$$\text{Clean Price} + \text{Accrued Interest} = \text{Dirty Price}$$

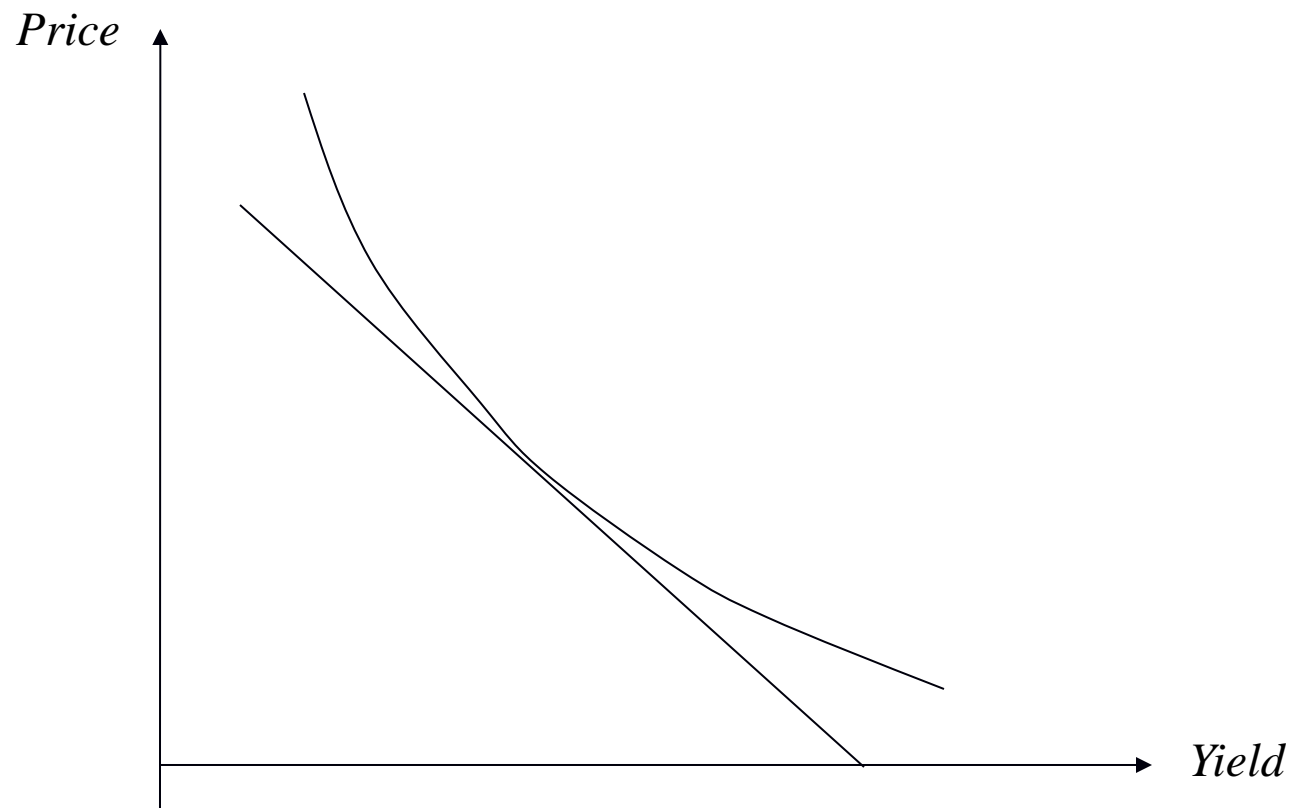
- Accrued interest
= $\frac{\text{days from last coupon payment}}{\text{no. of days in coupon period}} \times \text{coupon amount}$
- Bond Price with accrued interest = Dirty Price



Bond Calculator -Excel

	A	B	
1	BOND CALCULATOR		
2			
3	Settlement	17-Feb-25	
4	Maturity	1-Sep-28	
5	CPN	11.50%	
6	Yield	10.35%	
7	Amount Face Value	50,000,000.00	
8	<u>Clean Price</u>	103.32319	=PRICE(B3,B4,B5,B6,100,2,1)
9	<u>Clean Price/round</u>	103.3232	=ROUND(B8,4)
10			
11	Accrued Interest Calculation		
12	Last coupon	01-Sep-24	=COUPPCD(B3,B4,2,1)
13	Next Coupon	01-Mar-25	=COUPNCD(B3,B4,2,1)
14	Acc Int	5.36878	=ACCRINT(B12,B13,B3,B5,100,2,1)
15	<u>Accrue/round</u>	5.36880	=ROUND(B14,4)
16	<u>Full Price</u>	108.6920	=+B15+B9
17	Accred Interest	2,684,400.00	=+B15*B21/100
18			
22	Disc Value (Clean)	51,661,600.00	=+B21*B9/100
23	Disc Value (Full)	54,346,000.00	=+B22+B17

Price/ Yield Relationship





YTM - Advantages

- It is a simplification and approximation
- Advantage of expressing yield with a single number
- NOT to be confused with RETURN
- Enables comparisons to be made across bonds



Total Return

Total Return on a security will include:

- Coupon income
- Reinvestment income (actuals)
- Change in market value

$$TR = \frac{\text{Coupon Income} + \text{Reinvestment Income} + \text{Capital Gain/Loss}}{\text{Initial Purchase Price}}$$

Effective yield can be calculated by annualizing the cumulative Total Return

Primary Market & Secondary Market



- Primary Market is the market between the issuer and the initial investor, all other transactions happens after that will be secondary market transactions

Feature	Primary Market	Secondary Market
Purpose	Issuance of new securities	Trading of existing securities
Participants	Issuer and initial investors	Investors trading among themselves
Capital Flow	Funds go to the issuer	Funds exchanged between investors
Example	T-Bill/ Bond Auction	Trading in bond market

Primary Market - Bonds



DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA ISSUE OF RS 67,500 MILLION TREASURY BONDS

Rs. 37,500 million Treasury Bonds under the series of 11.50%2028 'A' and Rs. 30,000 million Treasury Bonds under the series of 11.00%2030 'B' are to be issued through an auction on February 13, 2025.

The details of these Treasury Bonds are as follows.

Series	11.50%2028 'A'	11.00%2030 'B'
ISIN*	LK2001528017	LK20007301158
Amount offered	Rs. 37,500 million	Rs. 30,000 million
Coupon rate	11.50% per annum	11.00% per annum
Date of issue	01 September 2023	15 October 2023
Date of maturity	01 September 2028	15 October 2030
Dates of coupon payment	01 March & 01 September	15 April & 15 October
Accrued interest amount	Rs 5.3688 per Rs.100.00	Rs. 3.7775 per Rs.100.00
Date of auction	Thursday, 13 February 2025	
Closing date and time of bid submission	Thursday, 13 February 2025 at 11:00 a.m.	
Date of settlement	17 February 2025	
Minimum amount of bid	Rupees five million (Rs. 5,000,000/-) and multiples of Rupees one million (Rs. 1,000,000/-) there onwards.	

Bids are invited from the Primary Dealers in Treasury Bonds on the basis of clean prices (exclusive of accrued interest from the date of last coupon payment to the date of settlement). Bids should be made only through the electronic bidding facility provided by the Central Bank of Sri Lanka (CBSL). The prospective investors (general public or any other investor) may submit bids to the auction through following Primary Dealers while complying with the minimum amount of a bid as mentioned above.

List of Primary Dealers

Bank of Ceylon	2541938	NSB Fund Management Co. Ltd	2425010
Capital Alliance PLC	2317777	People's Bank	2206783
Commercial Bank of Ceylon PLC	2332319	Sampath Bank PLC	2305842
First Capital Treasuries PLC	2639883	Seylan Bank PLC	2456340
HNB Securities Ltd	2206297	WealthTrust Securities Ltd	2675096

With respect to each Series/ ISIN, CBSL may accept any amount not exceeding the amount offered depending on the market conditions.

Prospective investors may also purchase Treasury bonds from Primary Dealers or any other Licensed Commercial Bank in the secondary market.

*International Securities Identification Number

Public Debt Department
Central Bank of Sri Lanka
30, Janadhipathi Mawatha, Colombo 1.
Telephone: 2477011 Fax: 2477687

N. D. Y. C. Weerasinghe
Superintendent /Registrar of Public Debt

Government Security – Secondary Market in Sri Lanka



- Main Participants –PDs, Banks, Insurance Co, EPF Funds & HNWI
- Secondary market trading happens through
 - Voice broker – brokered market
 - Bloomberg Bond Trading Platform
 - Bloomberg / Reuters dealing – direct market
- Minimum Ticket Size LKR 50Mn and in 50Mn multiples
- Bid / Offer YTM base example 10.35 %/ 10.30 %
- Major portion of secondary market trades flows through name passing brokers (broker commission 0.015%)

What Investors Should Monitor

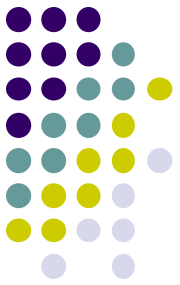


Macro-Economic Indicators (Long-Term Market Trends)

- Inflation Rate – Headline & Core Inflation
- Monetary Policy (CBSL Decisions)
- Fiscal Deficit & Government Borrowing
- Private sector credit growth
- Foreign Reserves & External Debt Repayments
- Exchange Rate Movements (USD/LKR)
- GDP Growth Rate

What Investors Should Monitor

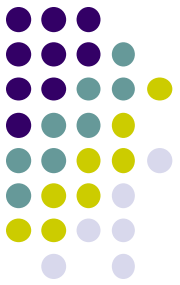
Day-to-Day Changes in the Financial Market



- **Overnight Market Liquidity (LKR)**
 - Net liquidity position in the **money market** (surplus or deficit).
 - CBSL's **Standing Facility** (SDFR/SLFR) and open market operations (OMO).
 - https://www.cbsl.lk/eResearch/Modules/RD/SearchPages/Indicators_DailyOperationsNew.aspx
- **Bond & Bill Maturity & Coupon Payment Schedule**
 - Upcoming maturities of Treasury Bills & Bonds.
 - Coupon payment dates affecting reinvestment demand
 - <https://www.cbsl.gov.lk/gosl-outstanding-debt-securities>
- **Bond & Bill Issuance Calendar**
 - New issuances affecting supply & demand dynamics.

What Investors Should Monitor

Day-to-Day Changes in the Financial Market



- **Primary Auction Statistics**
 - Bid-to-Offer Ratio – Measures demand for T-Bills/Bonds at auctions.
 - Weighted Average Yield (WAY) – Tracks trends in borrowing costs.
 - Cut-Off Yields – Indicates investor sentiment at auctions.
- **Direct Issuance Window Participants**
 - Demand at the Direct Issuance Window
- **Government Security holding by offshore investors**
 - Reported weekly in weekly Economic Indicators
 - <https://www.cbsl.gov.lk/statistics/economic-indicators/weekly-indicators>

Risk Analysis of Fixed Income Securities



1. Market Risk ,or interest rate risk
2. Reinvesting Risk
3. Credit risk
4. Inflation or purchasing power risk
5. Liquidity risk
6. Exchange Rate or currency risk
7. Event risk



Summary of Key Learnings

- Understanding Fixed Income Instruments
- Money Market Fundamentals
- Pricing of T-Bills & Bonds
- Auction Process and Secondary Market Operations
- Economic Indicators & Market Data relevant for the market
- Risk involve in FI Investment



Q & A